TEXAS HIGHWAY DEPARTMENT

Construction & Maintenance

BULLETIN No. 14
Aug. 1952

Foreword

This bulletin is published for the purpose of presenting practical information applicable to current highway problems. These conclusions and data are not necessarily endorsed by the Highway Department nor are they to be construed as instructions. Employees are invited and urged to submit suggestions and relate experiences which would benefit those engaged in the construction and maintenance of highways.

Photographic services are available and other assistance may be obtained if desired in preparing material for submission. All material and comments should be directed to the Chief Engineer, Construction & Maintenance, Austin, Texas.

Published Jointly by

Maintenance Division	**D- 3**
Equipment & Procurement Division	**D- 4**
Construction Division	**D- 6**
Traffic Services Division	**D-16**

COMPILED AND EDITED
INFORMATION SECTION,
TRAFFIC SERVICES DIVISION
REPRODUCED
OPERATIONS DIVISION
TEXAS HIGHWAY DEPARTMENT
AUSTIN 14, TEXAS

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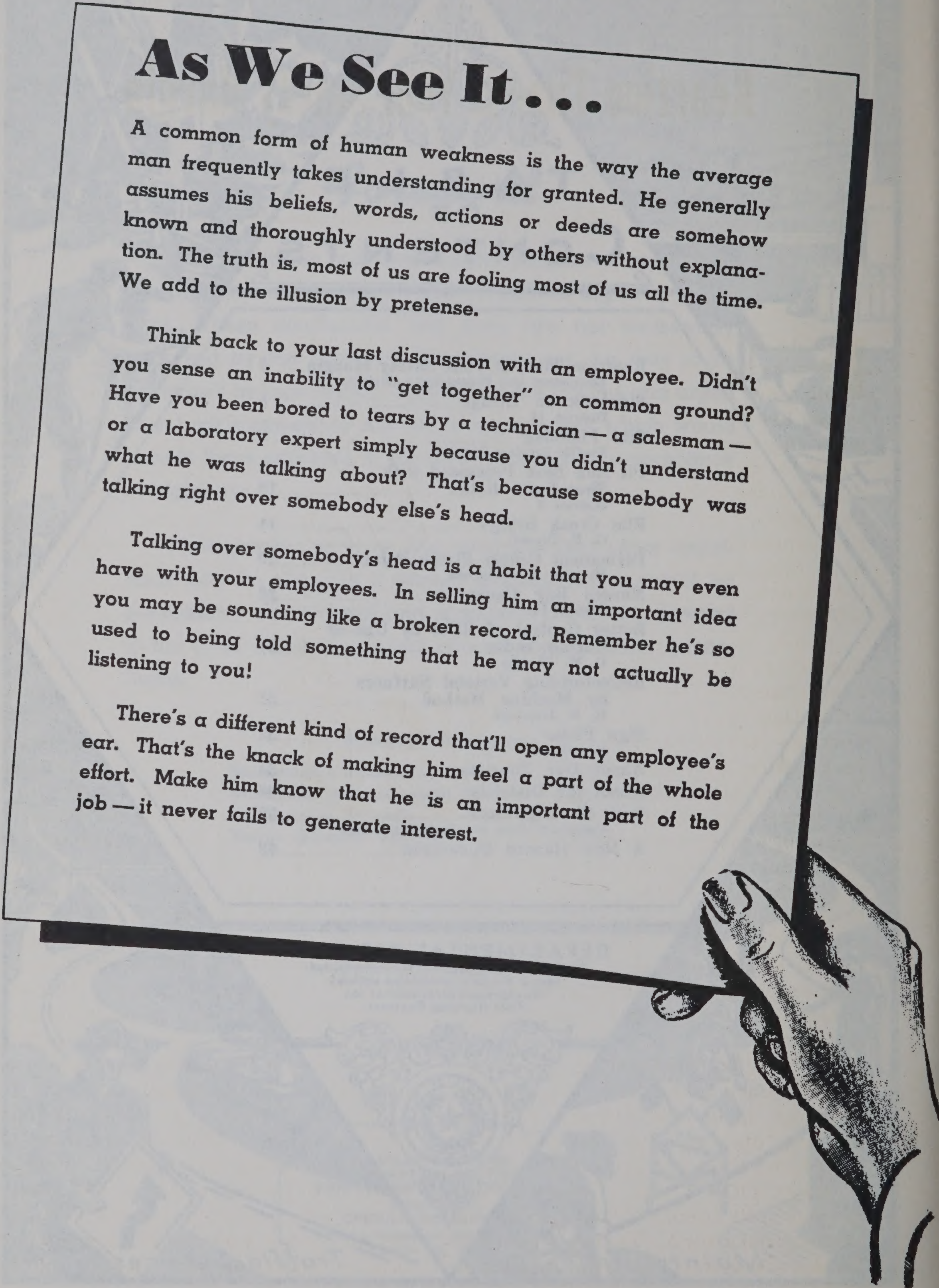


As We See It . . .

A common form of human weakness is the way the average man frequently takes understanding for granted. He generally assumes his beliefs, words, actions or deeds are somehow known and thoroughly understood by others without explanation. The truth is, most of us are fooling most of us all the time. We add to the illusion by pretense.

Think back to your last discussion with an employee. Didn't you sense an inability to "get together" on common ground? Have you been bored to tears by a technician — a salesman — or a laboratory expert simply because you didn't understand what he was talking about? That's because somebody was talking right over somebody else's head.

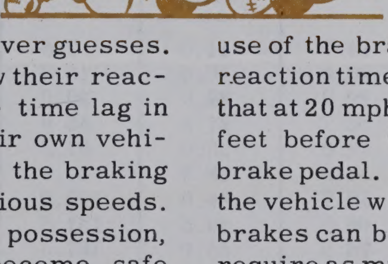
Talking over somebody's head is a habit that you may even have with your employees. In selling him an important idea you may be sounding like a broken record. Remember he's so used to being told something that he may not actually be listening to you!

There's a different kind of record that'll open any employee's ear. That's the knack of making him feel a part of the whole effort. Make him know that he is an important part of the job — it never fails to generate interest.

Reaction Time is Your Safety Margin

Equipment and Procurement Division

IT TAKES TIME to react to the need for making a stop. It takes TIME to get your foot from the accelerator to the brake pedal. It takes TIME to push the brake pedal down. It takes TIME for the braking effort to be transmitted to the brake drums through the hydraulic or air lines and the braking mechanisms. And after the brakes have been applied, it takes TIME for the vehicle to come to a safe stop.



Some of the above maneuvers may take only a split second, but they all add up to seconds, and seconds mean critical feet in stopping distance. A good driver considers all these factors in negotiating a stop; a poor driver guesses.

All drivers should know their reaction time as well as the time lag in brake application for their own vehicles. They should know the braking distances required at various speeds. With such facts in their possession, more drivers should become safe drivers.

STOPPING DISTANCE. The stopping distance for any vehicle and driver is made up of reaction time plus the braking distance for the particular speed and road surface conditions.

REACTION TIME. Reaction time is that split second it takes to hit the brake pedal after a warning signal has been received. The time it takes to think the situation over before braking, though only a fraction of a second, is usually critical. Reaction time varies with drivers and with any one driver from day to day. Surprisingly enough, most drivers do not know their reaction time -- and virtually all overestimate their ability to hit the brake pedal at a danger signal. This can lead to three things -- overconfidence, overspeeding, and accidents.

REACTION DISTANCE. It takes .4 second for the average driver to remove his foot from the accelerator and touch the brake pedal, even when he knows what to expect. Under actual driving conditions, when unforeseen circumstances necessitate use of the brakes, the average driver reaction time is .75 second. This means that at 20 mph the vehicle will travel 22 feet before the driver can reach the brake pedal. At a road speed of 60 mph, the vehicle will travel 66 feet before the brakes can be applied. Some drivers require as much as 1.5 seconds to react to a danger signal. At 40 mph such a driver would travel 88 feet before he put his foot on the brake pedal.

Let's all take a good look at our driving habits. Chances are most of us have no better than average reaction time. For your own safety, the safety of the other driver, and the conservation of our equipment, remember this -- "Reaction time is your safety margin."

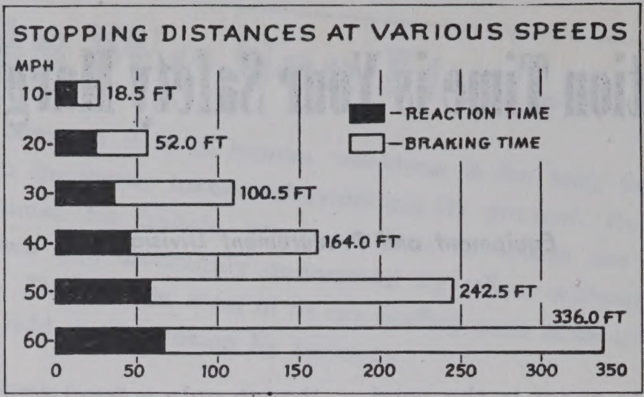


Chart shows stopping distances at various speeds with brakes at 50 per cent efficiency. Reaction time distance is given in black; braking distance in outline view. Reaction time was..75 second.

Miles Per Hour	Equivalent Feet Per Second	Reaction-Time Distance (feet)	Braking Distance (feet)	Total Stopping Distance (feet)
10	14.7	11.0	7.5	18.5
15	22.0	16.5	16.9	33.4
20	29.3	22.0	30.0	52.0
25	36.7	27.5	46.9	74.4
30	44.0	33.0	67.5	100.5
35	51.3	38.5	91.9	130.4
40	58.7	44.0	120.0	164.0
45	66.0	49.5	151.9	201.4
50	73.3	55.0	187.5	242.5
55	80.7	60.5	226.9	287.4
60	88.0	66.0	270.0	336.0

Table shows reaction time distance, braking distance, and total stopping distances for speeds from 10 to 60 miles per hour.

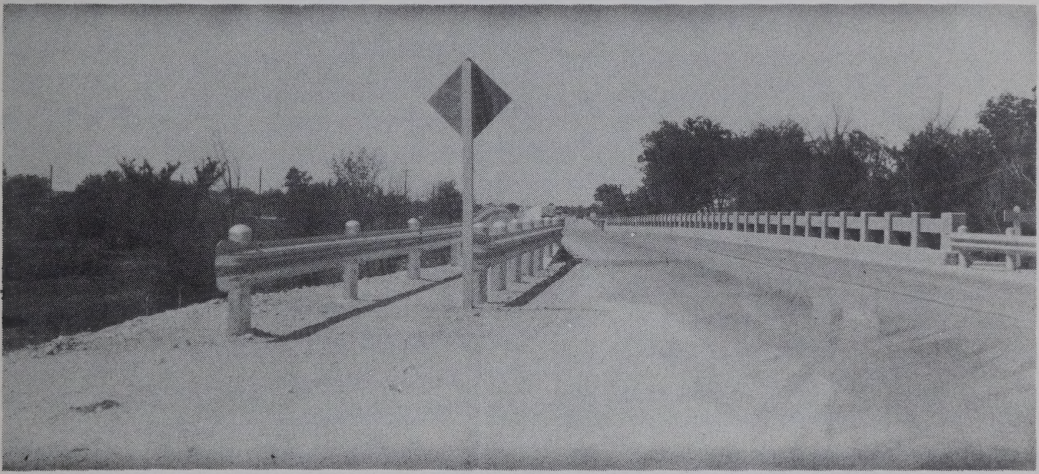
BRUSHY CREEK BRIDGE AT ROUND ROCK

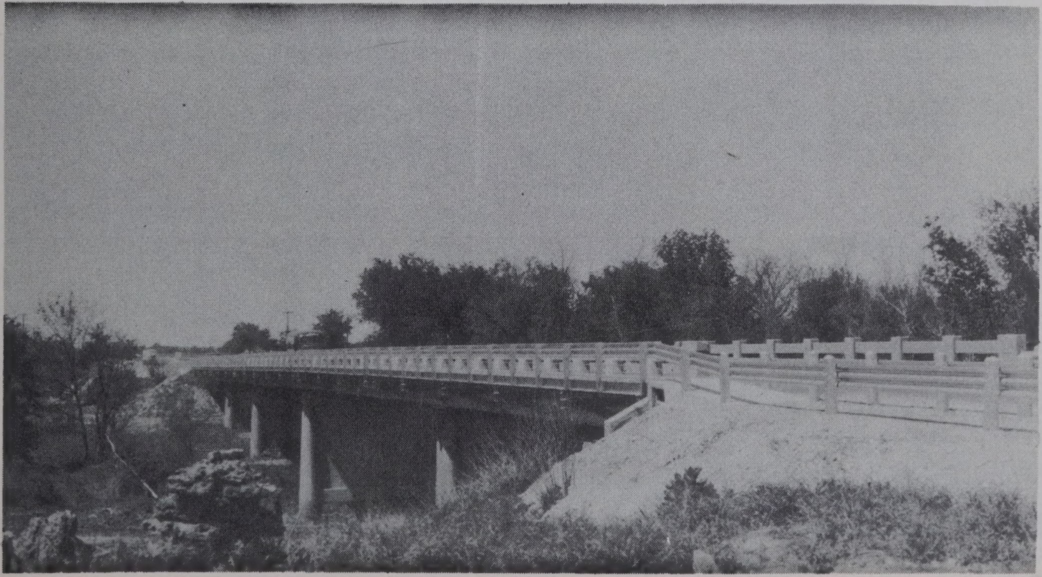
SIDEWALK ON BRIDGE

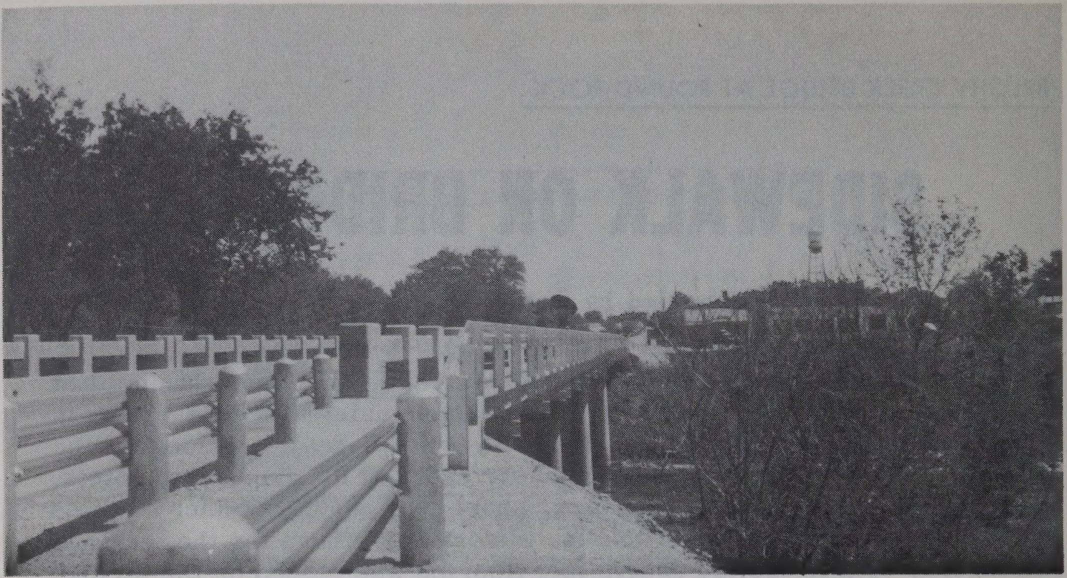
Submitted by District 14

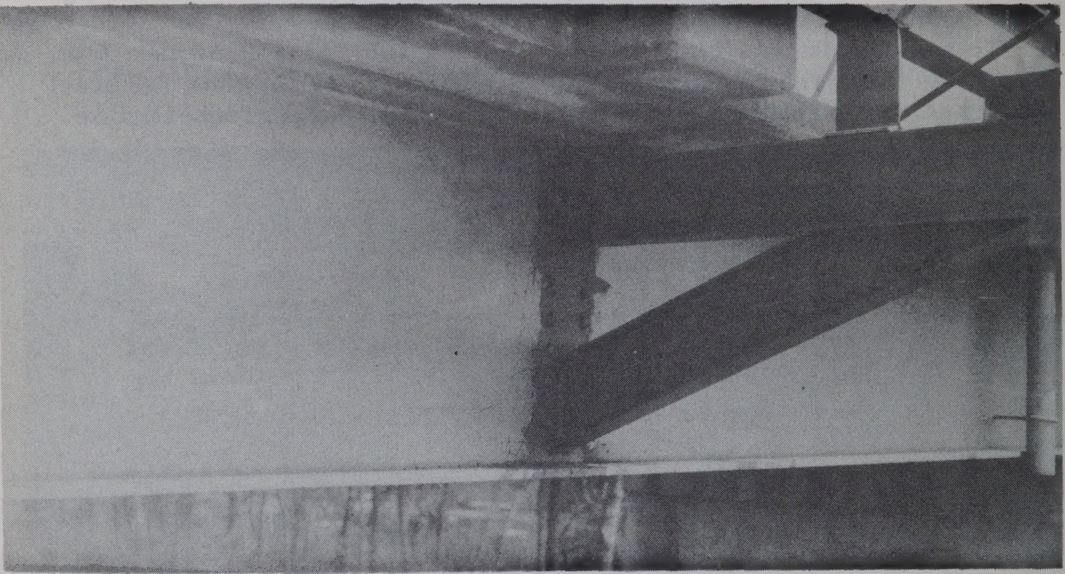
With the exception of the flex-beam rail, the sidewalk pictured was constructed entirely of salvaged material. The brackets were made of eight-inch by 18.4-pound I-beams welded to the outside of the 33-inch by 125-pound stringers at all diaphragm points. In order to get the height necessary, short sections of ten-inch I-beams were welded on top of the brackets, to serve as risers for the ten-inch stringers. Three-foot by twelve-foot flooring was placed on the stringers. Construction details are shown on the sketch.

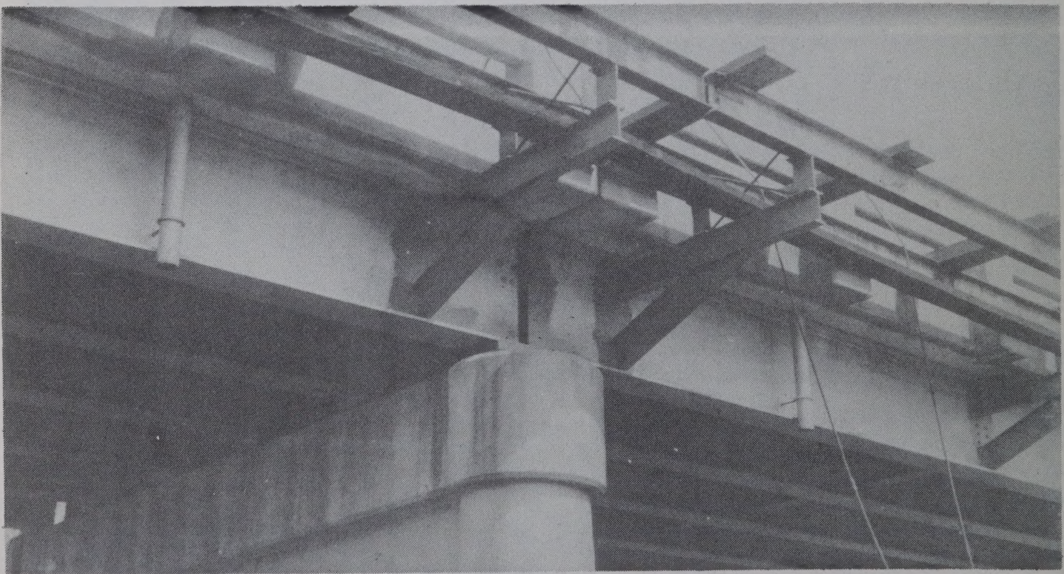
This sidewalk was estimated to cost $4,100, or $12.50 per foot. Since the final figures are not yet available, we do not know the exact cost, but it will probably be slightly less than the $12.50 per foot estimate.

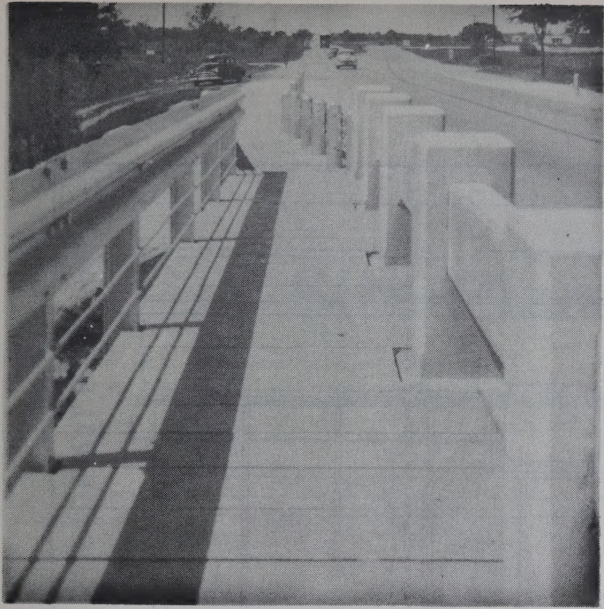


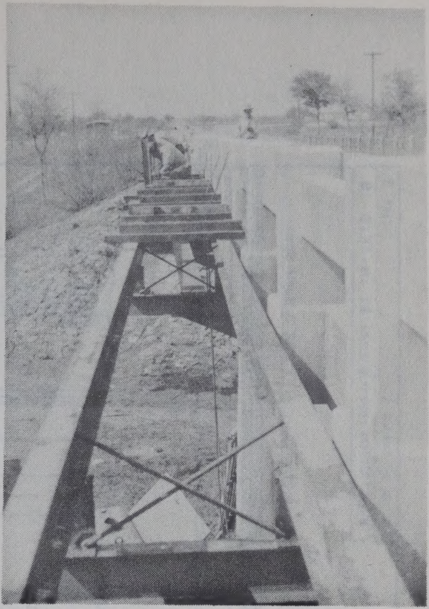


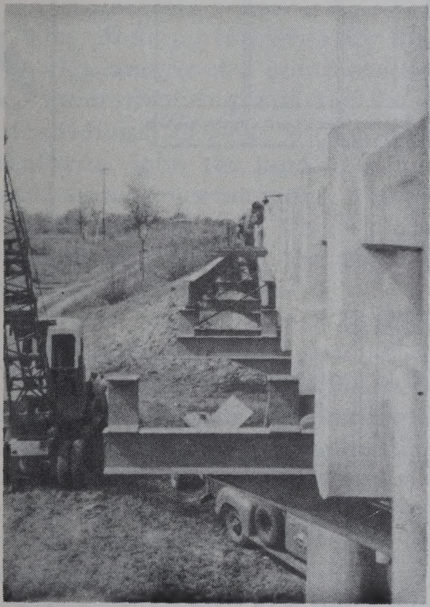


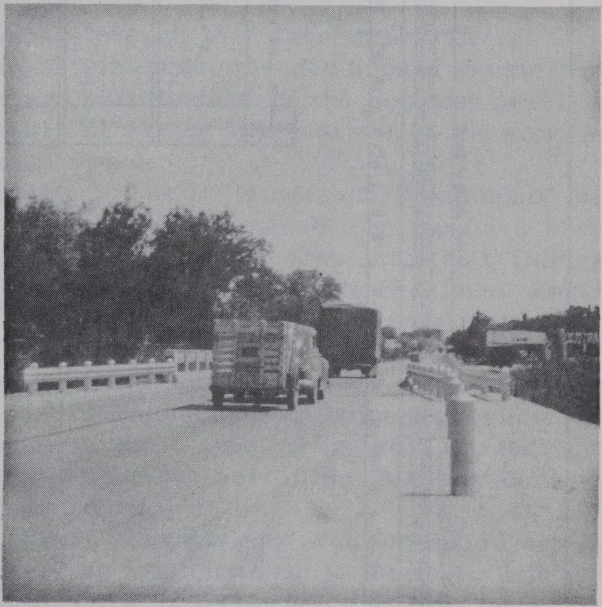


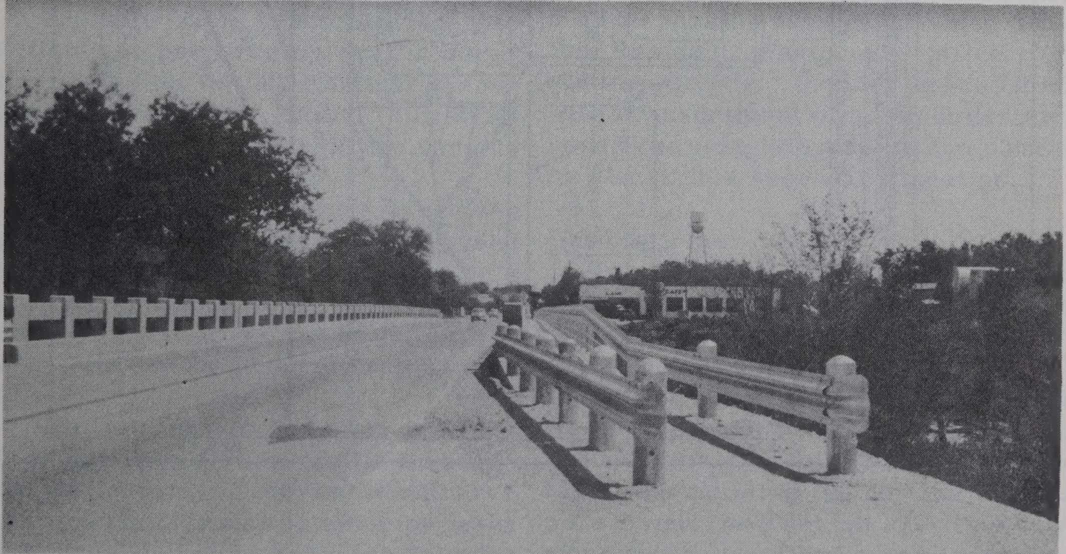


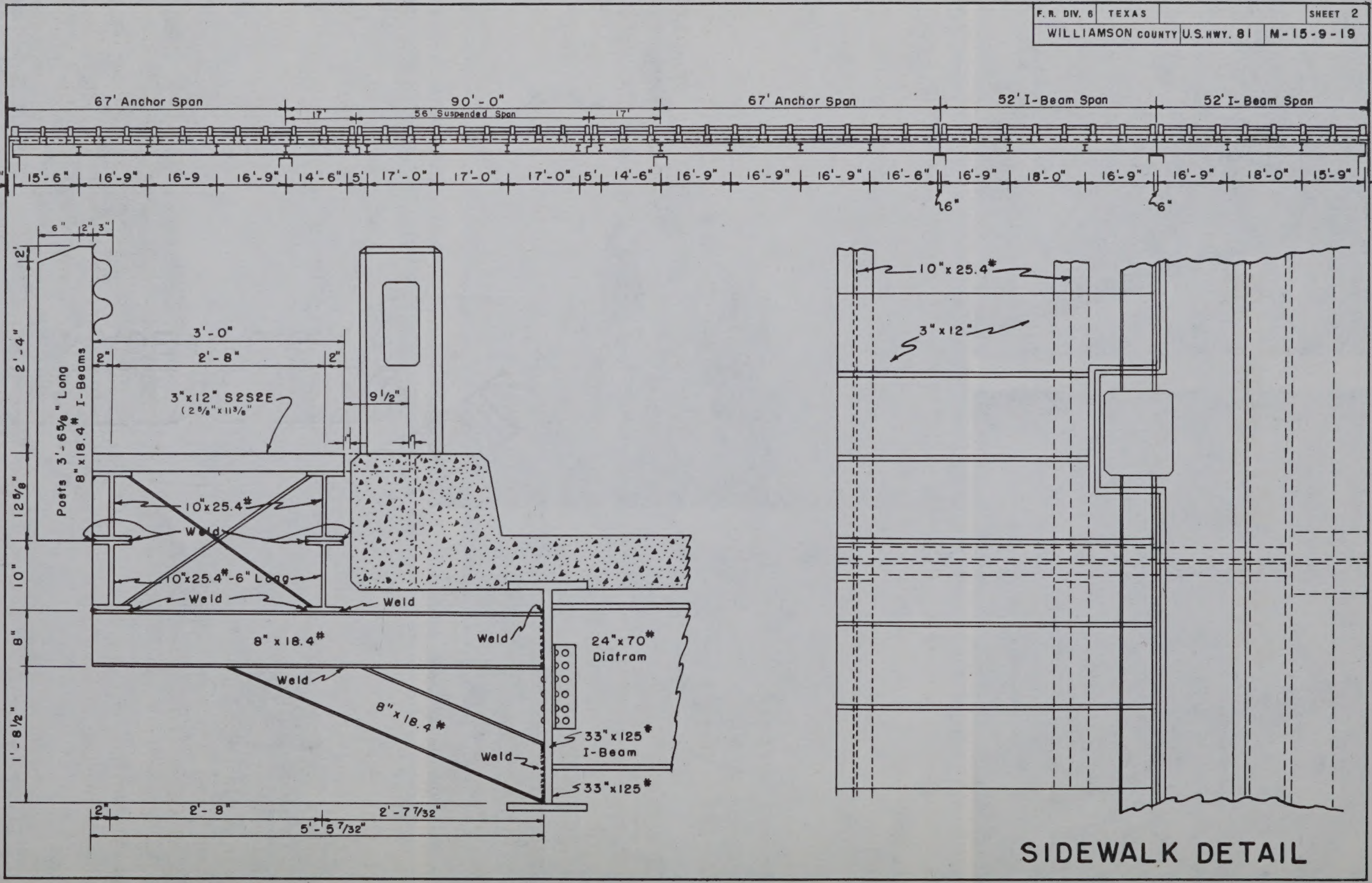












SIDEWALK DETAIL

Site Planning

TRAFFIC SERVICES DIVISION

Site planning is in reality the overall planning of a complete development involving land and the placing of buildings, drives, walks, and other features upon the land in a functional and harmonious manner. The site plan is evolved through three plans: the organizational plan, the grading plan, and the planting plan.

Organizational Plan:

The organizational plan is orderly arrangement of the various features of the development based upon functional use, taking into consideration topography of the land, surrounding features, exposures, natural features such as vegetation, and many other factors dictated by the individual site.

The site plan accompanying this article was prepared by Traffic Services Division for the Kaufman Warehouse and Residency Office in District 18 and is used to illustrate the various phases of site planning.

In this plan the buildings have been grouped together, where possible, and set well back from the highway on a uniform building line. This setback creates a setting for the buildings and one looks into the property rather than at it.

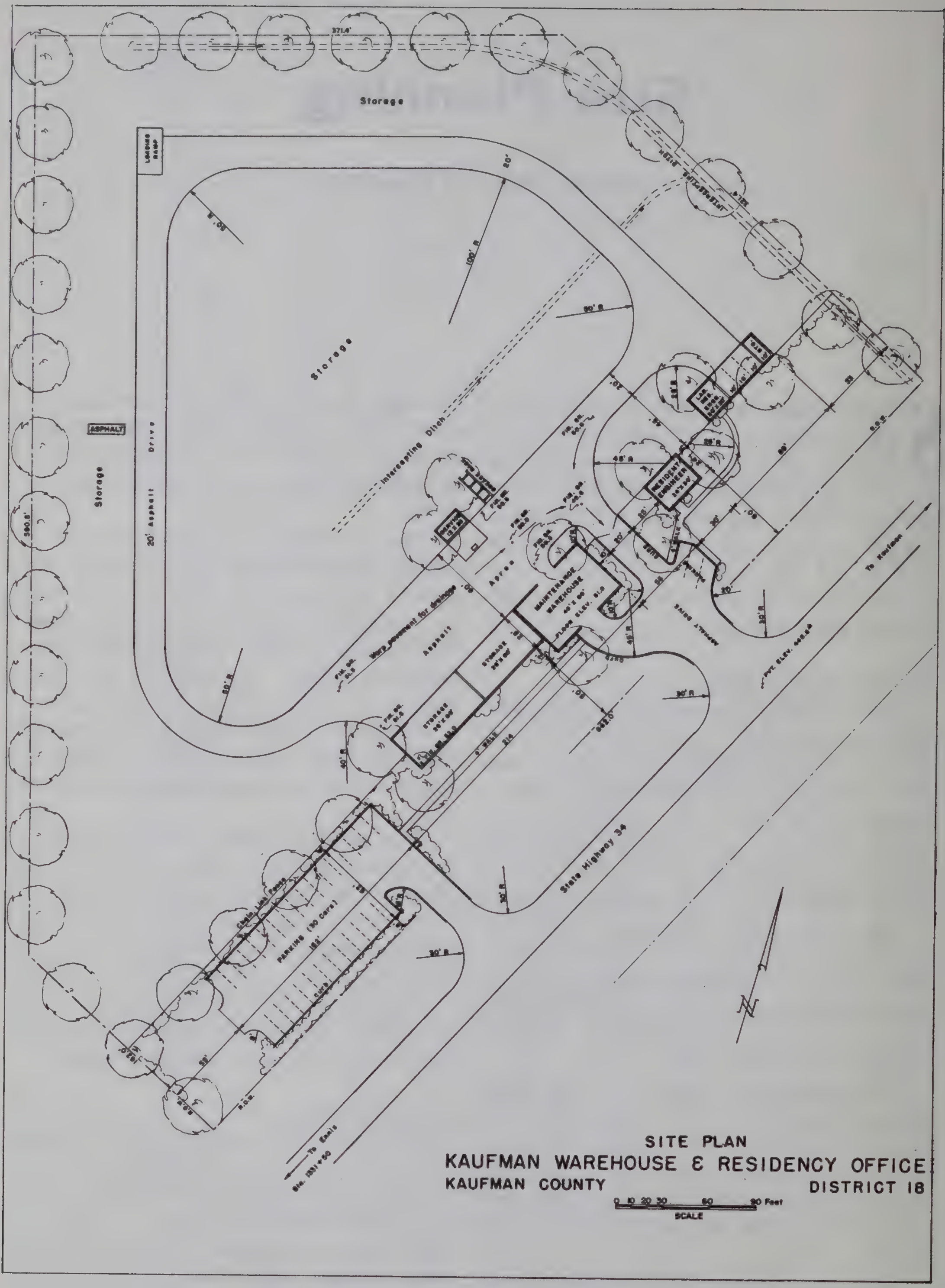
The circulation has been designed to permit easy flow of traffic throughout the property. The double entrance drive permits trucks to enter or leave the grounds without having to pass through the warehouse. Drives are also recommended around the storage yard instead of the common practice of paving large areas of the storage yard.

The buildings and functions of the county maintenance group have been placed in one area, and the buildings and functions of the Resident Engineer's office have been grouped in a separate area. Combining the facilities of these two groups into a harmonious development provides the highest type of installation that the public expects of the Highway Department.

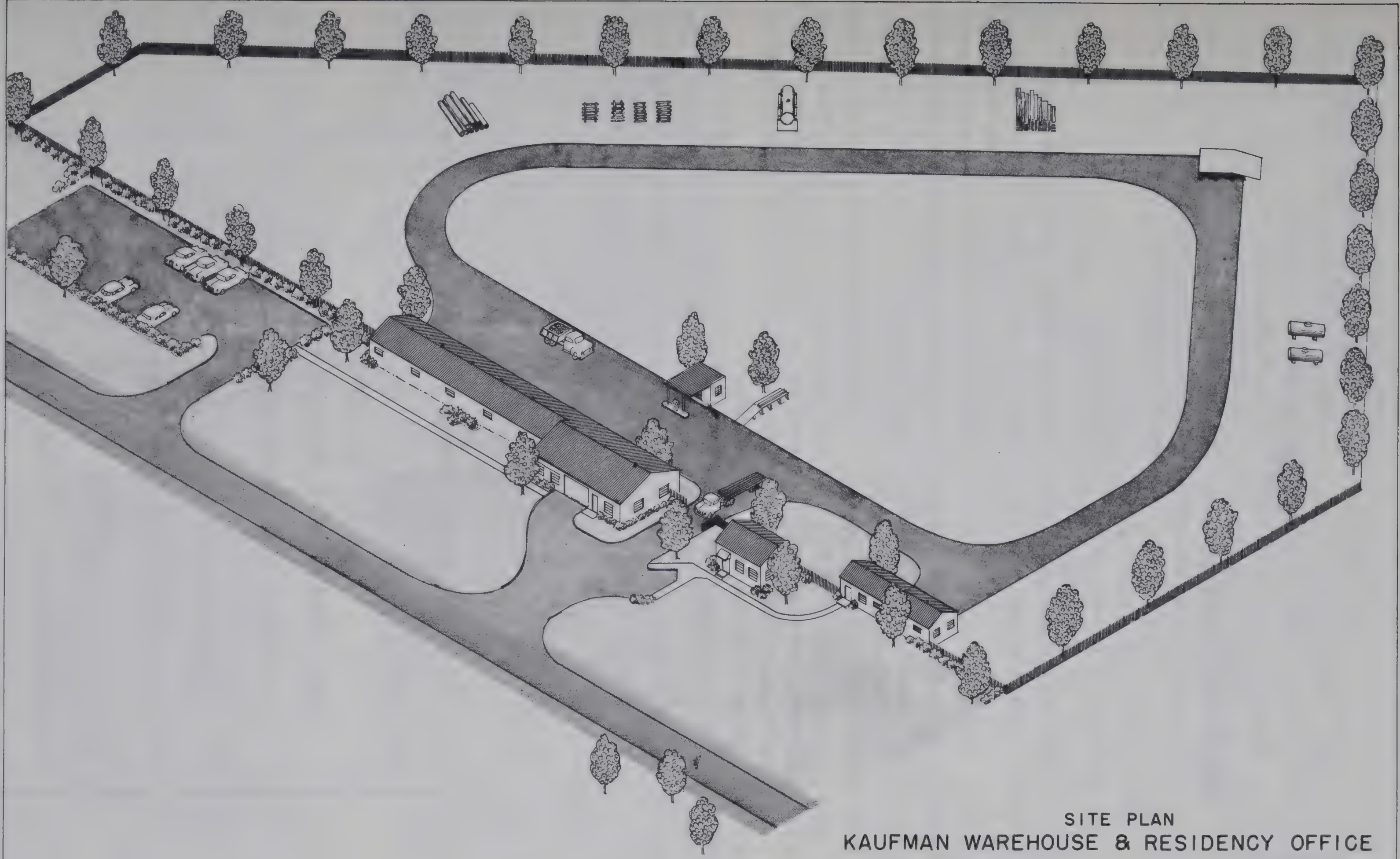
The parking area for employees is so located as not to interfere with the view of the building groups; however, a small parking area is provided near the Resident Engineer's office for visitor parking. Parking areas filled with an assortment of automobiles are usually an unsightly feature and should be placed in a secondary location.

Grading Plan:

Too often buildings are placed without adequate thought being given to drainage and appearance of the buildings in relation to the land. In reality, the setting of the grade for the finished floor is probably the most important item of any development. If set too high, the building sticks out like a sore thumb, or if set too low, then any work done is usually of a forced nature



SITE PLAN
KAUFMAN WAREHOUSE & RESIDENCY OFFICE
KAUFMAN COUNTY DISTRICT 18



SITE PLAN
KAUFMAN WAREHOUSE & RESIDENCY OFFICE
KAUFMAN COUNTY DISTRICT 18

requiring expensive drainage installations.

First, of course, is the matter of adequate drainage. Preparation of a drainage plan assures that run-off water will be carried away from the buildings and not allowed to stand in low areas. Adequate provisions beforehand can be made for necessary drainage facilities and materials.

Often grading is also essential in shaping the ground for proper placement and elevation of buildings. No two sites are identical and each one should receive careful study.

Planting Plan:

Although great care may be taken in the organizational and drainage plan to accomplish a functional design, the site plan cannot be fully accomplished without the planting plan. Through proper placing of trees, shrubs, vines, and grass, the mechanical installations can be made to blend with the land.

It will be noted that trees around the buildings are placed to give a maximum of shade in the afternoon. Trees and shrubs are also utilized to screen the storage yards and parking area.

The grounds of the layout are sodded to present a setting for the buildings and to protect the soil from erosion.

A study of the soils should be made before any planting is done to determine if any soil adjustments should be made to support the proposed planting.

Conclusion:

Residency offices are now being constructed in several districts and many of our present warehouses will in the near future be relocated. With preliminary thought and plan preparations such as described above, many fine examples of developments can be accomplished.

Since these installations are along the highways, they will serve as examples to private individuals in the development of their own establishments.

Traffic Services Division is equipped and ready to assist the districts in any site planning problems.

* * *

IN ERROR

District 18 has advised us that in an article in Bulletin 13, "Cold Poured Sealing Compound for Maintenance of Concrete Pavement," credit for designing the plow used in removing old joint material was given to T. A. McBride. This credit should have gone to G. M. Donahoe, Senior Maintenance Foreman, of Wood County.

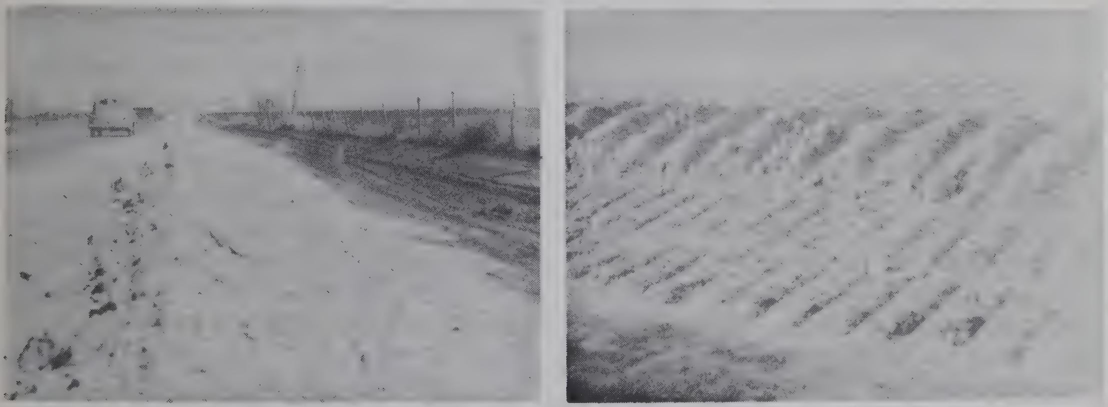
Pit Run Base Processed with Shop-Built Roller

DISTRICT 8

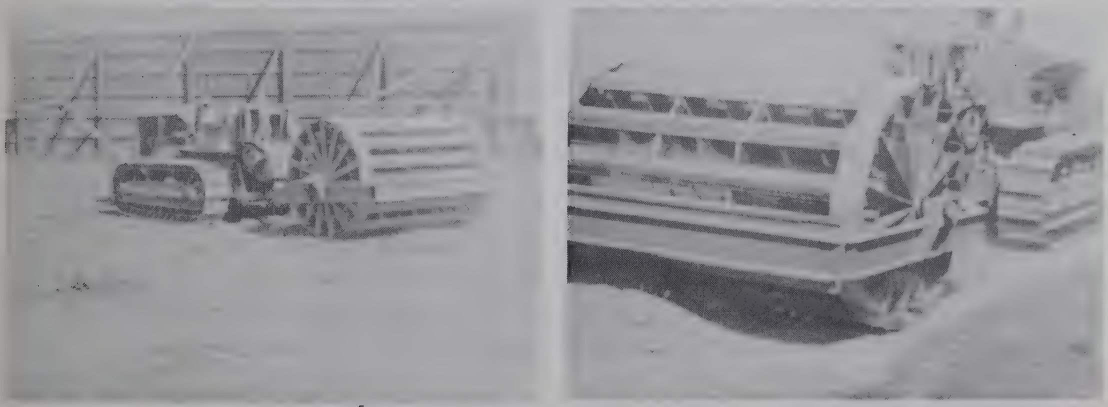
A roller has been built by the Abilene District which breaks down oversized base material more economically and more efficiently than any other method tried.

The roller was built in the District Shop from junk material at a cost of $600. It is five feet in diameter and eight feet long, has nine sets of spokes, with fifteen spokes to each set. The ribs are composed of three inch and four inch angle iron and are spaced about one foot apart. An eight inch band covers the ends of the ribs to assist in turning around. The axle is made of a two and seven-eighths inch shaft inside a three inch pipe. With the old rails, which were added for ballast, the total weight of the roller is 8, 000 pounds.

The roller and its use are illustrated in the pictures.



(Before rolling) **Flexible base material.** **(After rolling)**



Shop-built roller used for breaking down oversized base material.

ELM CREEK BRIDGE

G. P. BROWN, *Senior Resident Engineer*
DISTRICT 22

DESCRIPTION:

This bridge is located approximately .4 mile west of U. S. 277 in Maverick County on F. M. 1589 about 1.5 miles northwest of Eagle Pass. It is 220 feet in length and is composed of two 25-foot slab spans on each end and two 60-foot box girder spans in the middle. The box girder sections are composed of three lines Army Surplus Bailey Bridges tied together with X-braces and used ten-inch I-Beams on four-foot centers for floor beams and a concrete slab with six-and-three-eighths-inch thickness on center line and five-and-one-half inch at curbs. The slab spans were FS-8-20-25 standard design. The two bents on each end are fourteen inch by 73# steel H-Piling and the three interior bents are two 30-inch columns on drilled shafts. The original plans called for sixteen-inch square concrete piling but the contractor, John F. Buckner and Sons, had the steel H-Piling on hand and requested the substitution at the same unit price which was approved by Supplemental Agreement and Field Change.

The old bridge was a 125-foot steel truss span with wooden approaches and the total over-all length was 230 feet. This old bridge was in a bad state of repair and had to be replaced. We were faced with two problems, the shortage of structural steel, and the excessive cost of construction on a low traffic count Farm to Market Highway. The first design considered was one 100-foot and one-130 foot continuous I-Beam units but it required approximately 60,000 pounds of structural steel and total estimated cost of approximately $39,000. We were informed by D-14 that some Surplus Bailey Bridge Box Girders were available and that plans had been prepared in Bastrop County for the type of structure we wanted. We revised the Bastrop County plans to suit our condition.

CONSTRUCTION METHODS:

We sent trucks after the Box Girder Sections in Austin and Bryan and the floor beams from Chaparrosa Creek Bridge in Zavala County and they were on hand when the contractor looked at the job.

The contract was awarded to John F. Buckner and Sons of Cleburne with the following quantities and unit prices:

Unclass. Struct. Excavation	10	C.Y.	2.00	20.00
Class "A" Conc. (Abts. & Bents)	52.7	C.Y.	47.00	2,476.90
Class "A" Conc. (Slabs)	140.6	C.Y.	47.00	6,608.20
Reinforcing Steel	33,989	Lbs.	0.12	4,078.68
Structural Steel	3,795	Lbs.	0.33	1,252.35
Drilled Shafts (2'-6" Dia.)	88	L.F.	33.00	2,904.00
14"x73# Steel H-Piling	302	L.F.	8.50	2,567.00
Railing, Type 10 R 17	440	L.F.	5.20	2,288.00
Class "B" Conc. Riprap	51	C.Y.	39.00	1,989.00
Remove Old Structures	1	Ea.		1,000.00
Erect. Box Girder Sections	1	L.S.		1,800.00
Erect. Floor Beams	16,256	Lb.	0.05	812.80
		Sub-total		27,796.93
		E & C		2,779.69
		Total		30,576.62
Charges on box girders and hauling cost, hauling cost of beams				3,026.78
		Total Cost		$33,603.40

The contractor drove the steel piling with a one-and-one-half-yard dragline and the Lone Star Foundation Company of Dallas drilled the shafts. Bar joists were used in pouring the 25-foot slab spans, thus eliminating considerable false work. The box girders were bolted and welded together, thoroughly cleaned with steel brushes on the ground, and then raised into place with the dragline. The floor beams were placed on the box girders and shimmed up with steel shims of variable thickness to compensate for the anticipated dead load deflection, and welded in place. After the slabs were poured, the box girder and floor beams were given three coats of paint.

SUMMARY:

It is estimated that this design saved approximately 55, 000 pounds of structural steel and $5, 000. The use of 25-foot slab spans for the entire bridge was not economically possible due to a deep ravine making substructure cost prohibitive.

The only design feature that did not work out according to plan was the calculated dead load deflection for the box girders. The maximum deflection in the center of the 60-foot box girder section was calculated to be one-and-one-sixteenth inch but it actually deflected almost two inches. The first slab poured was thickened to compensate for the excessive deflection and the second span was raised prior to the pour by using thicker shims.

The 60-foot box girder spans seem to be extremely flexible under a heavy loaded truck and it is thought that means of strengthening probably should be investigated.

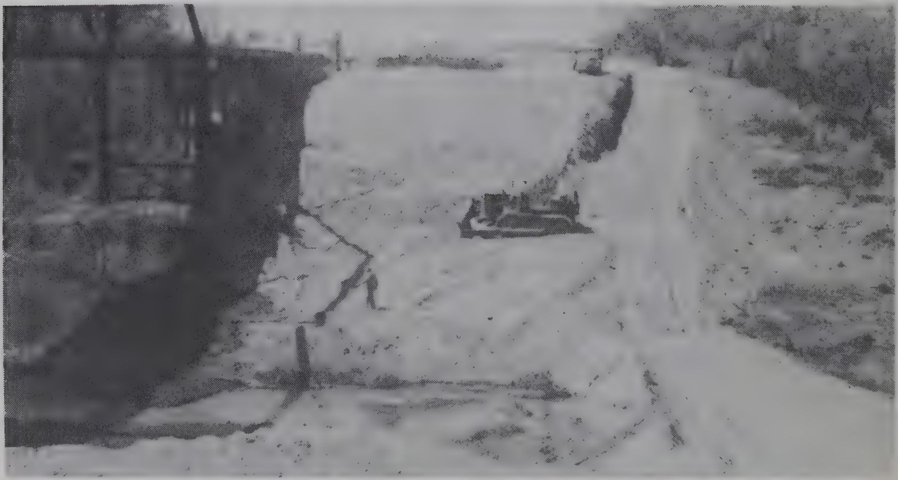
Old structure in place.

⇧

Old structure. ⇨

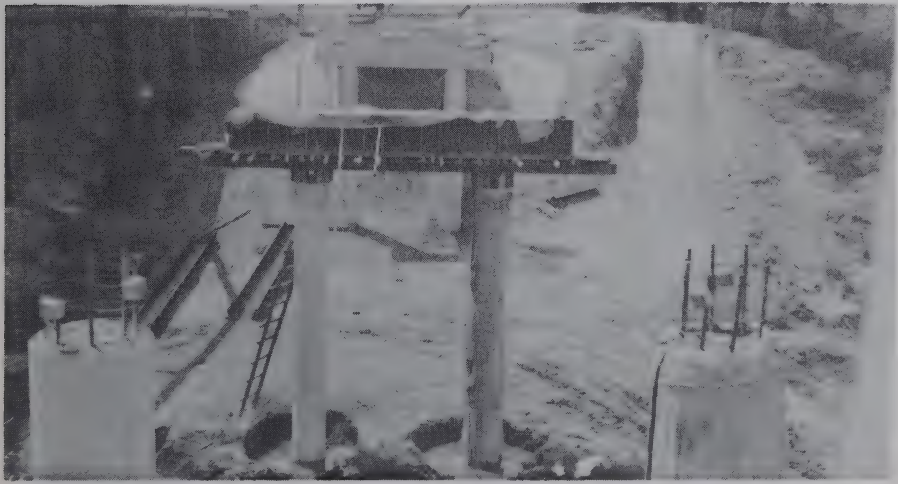
Bridge site.

⇩



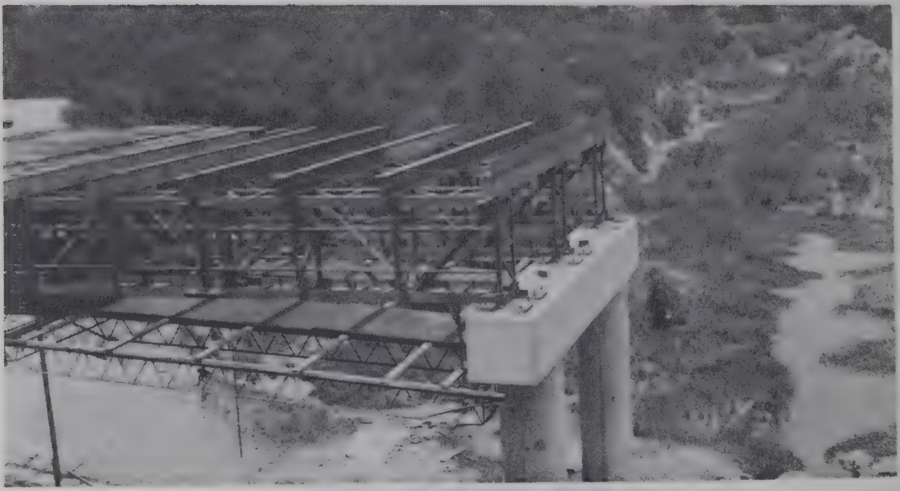
Drilling shafts.

Column forms being placed.



Columns completed.

First box girder span in place.

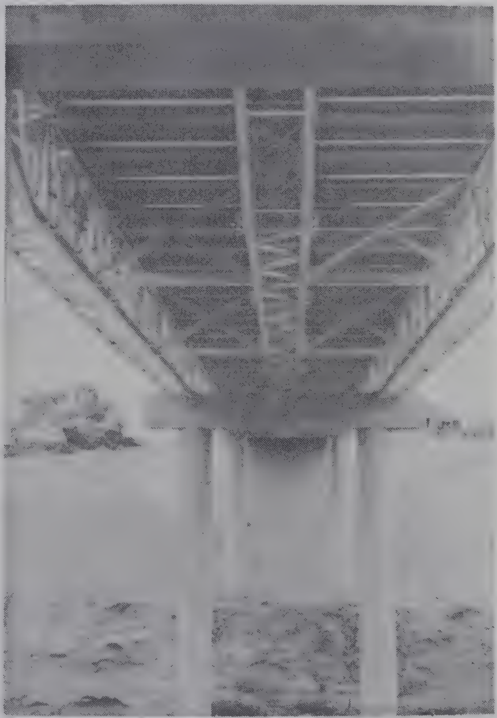


Box girder resting on center bent.

Second box girder span in place.

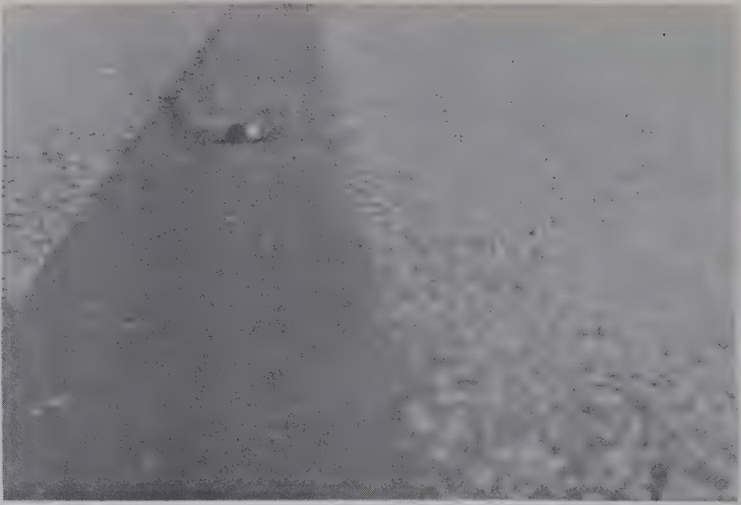
Completed box girder spans.

Old structure dropped in stream.



Bottom view of box girders.

Completed structure.



District 8 reports using rivets for center point markers. Tests indicate that these markers should be visible after two more seal coats.

Permanent Center Stripe Points

Herman H. Landrum, Chief Inspector

District 8

A method for retaining points for center stripe on asphalt roads has been developed in this district which is expected to reduce the future cost of striping considerably.

In the past we have used nails driven through soda pop lids into the pavement for centers by which to place the pilot line. However, after the stripe or seal coat was placed these points were covered and when the time came for a new stripe, the field party had to relocate the center.

In an attempt to eliminate this repeated field party cost, we developed a permanent center point to use in establishing the pilot line. This new point is an iron rivet, two inches long with a three-quarter-inch round head. We have placed some trial rivets over the district to determine if they were visible after the seal coat was placed and have found that they were still visible after the seal coat and center stripe were placed. We believe they will remain visible through two more seal coats. The longer these points stay the easier they are to find. This is because the sun heats up the rivet and causes the asphalt to melt off of it and when the traffic passes over it, the rivet is automatically shined up and becomes more visible.

For putting a wedge point on the rivet, the blacksmith's power hammer is used. Very few blows are needed to get the desired result, as the point will flatten without heating. We have used different length rivets and decided upon the two-inch ones. They are cheaper and stay in the pavement as well as the longer rivet. It has been found that they can be driven more rapidly than the nail and bottle cap.

We have prepared nearly 70 miles of center line in placing the rivets ahead of our 1952 asphalt program, driving them on tangents at intervals of 200 feet and on curves at approximately 50-foot intervals. Cost per rivet prepared for driving is about 5 cents.

The rivets are set 200 feet apart on tangents and 50 feet apart on curves. Traffic on rivet heads maintains their visibility.

After the two-inch rivets with three-quarter-inch heads are cold hammered to a wedge point they cost about 5 cents each and can be driven faster than nails and bottle caps.

Location of new causeway. Dredge at work building the north approach.

Nueces Bay

DISTRI

Transit mount devised by resident engineer centered on test piles at 1,000-foot intervals for lining in regular piles.

Rig for driving test piles in bay.

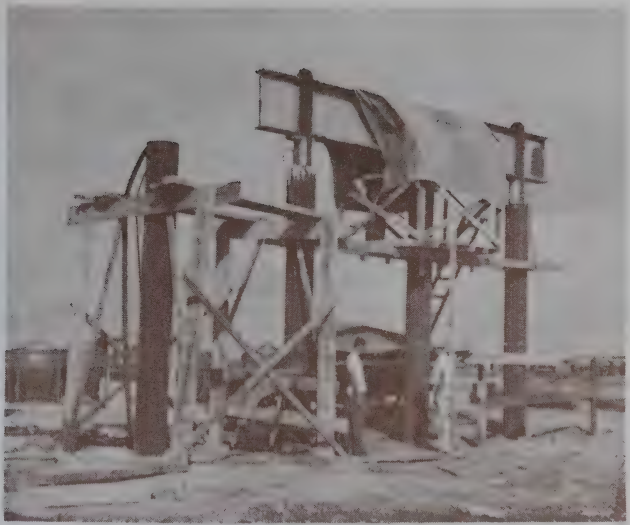
Cost:	$2,454,
Length:	9,636.5
Date work began:	7-11-49
Date completed:	10-2-50
Working days	
Requested:	500
Used:	331
Contractor:	Austin B Dallas,

Causeway

T 16

293

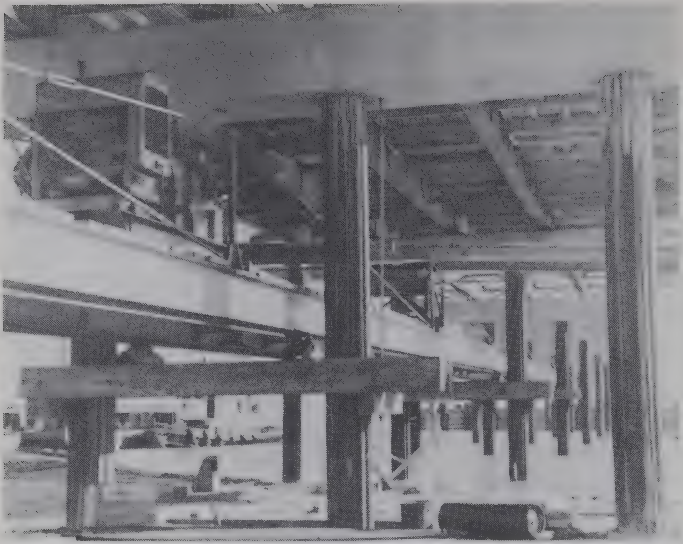
Co. Contractors



Method of test loading one of three piles.

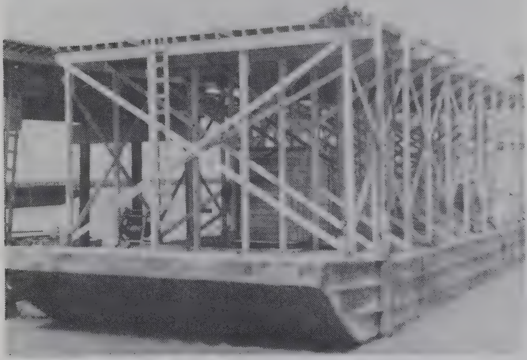
Erecting steel girders near south end.

Filling 1 1/2 cu. yd. concrete buckets on barge for transporting to fill metal pile shells and build caps.

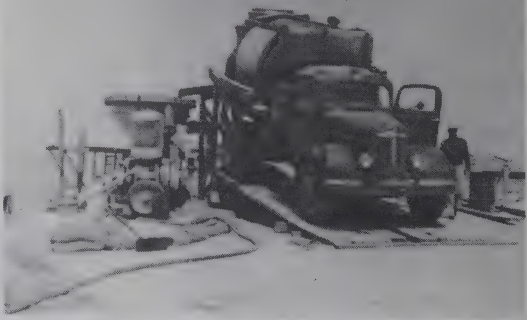


Underslung traveling platform 25 feet long used in removing and transporting slab forms forward while concrete work was underway on intermediate sections.

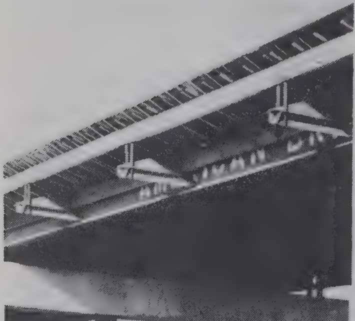
Placing slab reinforcing steel off of platform erected on a barge at causeway floor level.



Working platform constructed on barge and used in transporting and erecting slab reinforcing steel.

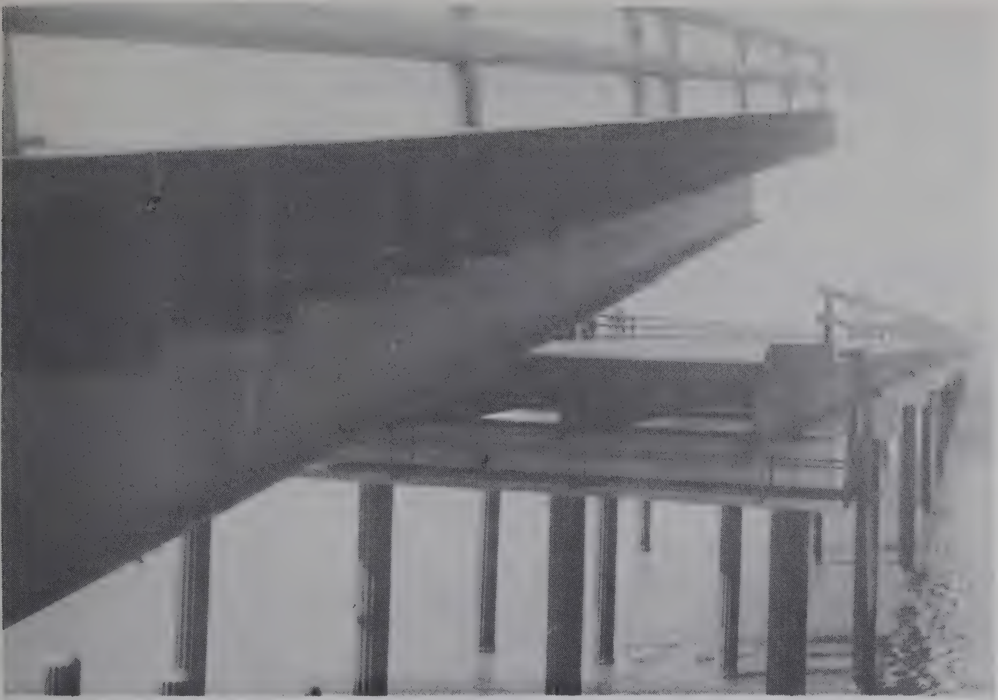


Loading Pump-crete machine from transit-mix trucks on finished and cured slab some 700 feet back of placing operations.



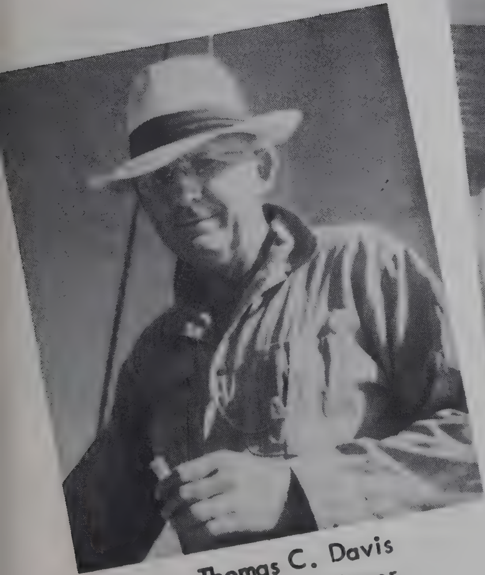
Note method of forming for overhanging curb.

Concrete placing operations, with concrete for slabs pumped through a six-inch line.



Opening the hydraulically-operated, single-leaf bascule span at navigation channel. This is the only structure of this type on the highway system.

THE OTHER SIDE OF THE STORY . . .

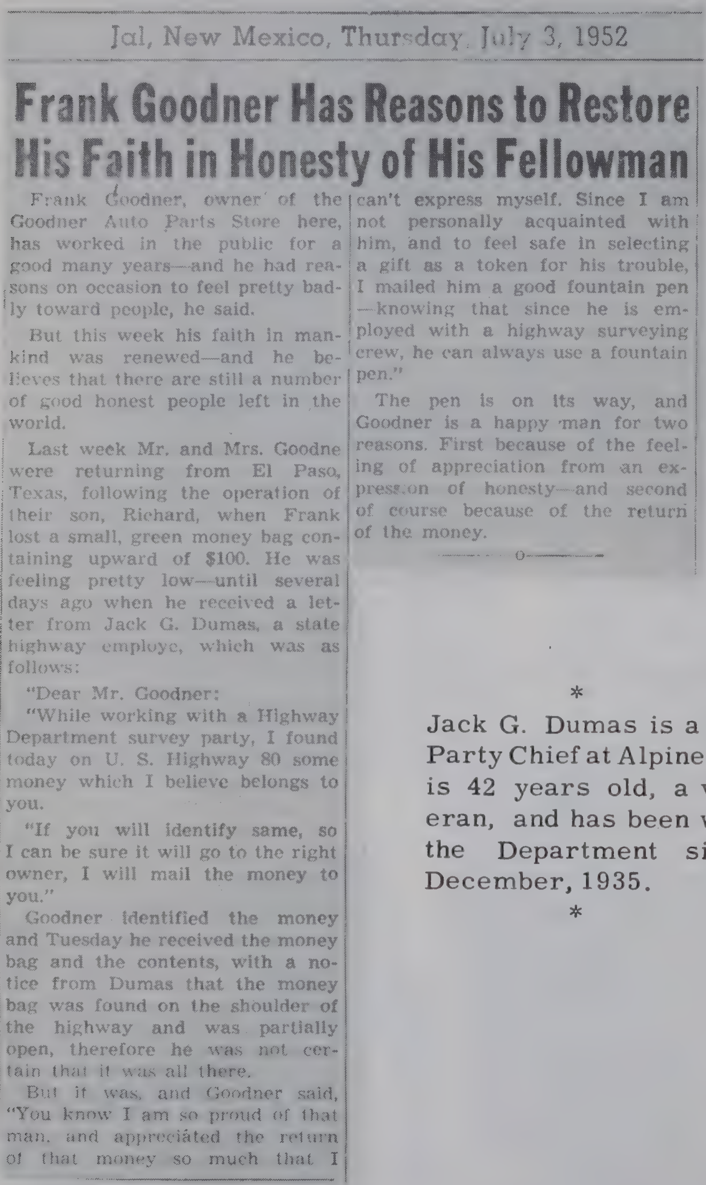


Thomas C. Davis
District Engineer

"Chico" Mason,
Fisherman

Fagan B. Mason
Sr. Resident Engineer in charge of work

Highway Personnel
. . . in the News



Jal, New Mexico, Thursday, July 3, 1952

Frank Goodner Has Reasons to Restore His Faith in Honesty of His Fellowman

Frank Goodner, owner of the Goodner Auto Parts Store here, has worked in the public for a good many years—and he had reasons on occasion to feel pretty badly toward people, he said.

But this week his faith in mankind was renewed—and he believes that there are still a number of good honest people left in the world.

Last week Mr. and Mrs. Goodne were returning from El Paso, Texas, following the operation of their son, Richard, when Frank lost a small, green money bag containing upward of $100. He was feeling pretty low—until several days ago when he received a letter from Jack G. Dumas, a state highway employe, which was as follows:

"Dear Mr. Goodner:

"While working with a Highway Department survey party, I found today on U. S. Highway 80 some money which I believe belongs to you.

"If you will identify same, so I can be sure it will go to the right owner, I will mail the money to you."

Goodner identified the money and Tuesday he received the money bag and the contents, with a notice from Dumas that the money bag was found on the shoulder of the highway and was partially open, therefore he was not certain that it was all there.

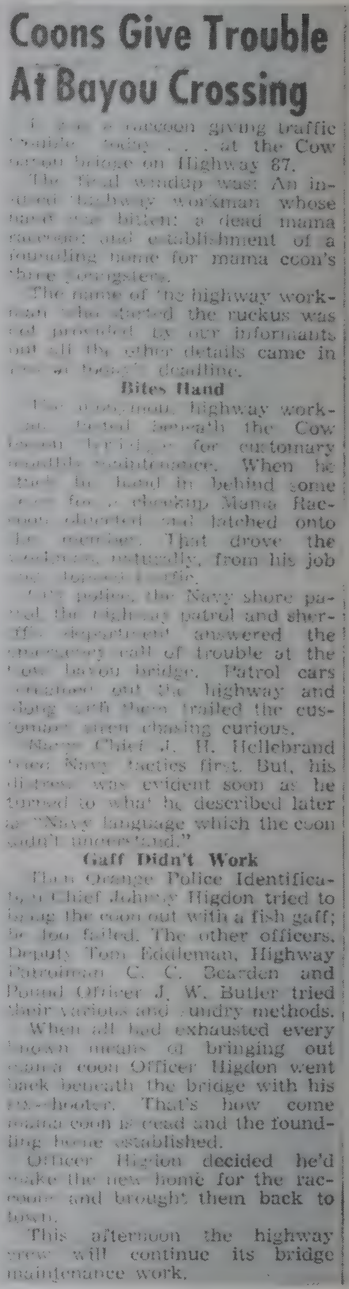
But it was, and Goodner said, "You know I am so proud of that man, and appreciated the return of that money so much that I can't express myself. Since I am not personally acquainted with him, and to feel safe in selecting a gift as a token for his trouble, I mailed him a good fountain pen—knowing that since he is employed with a highway surveying crew, he can always use a fountain pen."

The pen is on its way, and Goodner is a happy man for two reasons. First because of the feeling of appreciation from an expression of honesty—and second of course because of the return of the money.

*

Jack G. Dumas is a Sr. Party Chief at Alpine. He is 42 years old, a veteran, and has been with the Department since December, 1935.

*



Coons Give Trouble At Bayou Crossing

It was a raccoon giving traffic trouble today . . . at the Cow Bayou bridge on Highway 87.

The final windup was: An injured highway workman whose hand was bitten; a dead mama raccoon; and establishment of a foundling home for mama coon's three youngsters.

The name of the highway workman who started the ruckus was not provided by our informants but all the other details came in before today's deadline.

Bites Hand

The anonymous highway worker [illegible] beneath the Cow Bayou bridge for customary monthly maintenance. When he stuck his hand in behind some [illegible] for a checkup Mama Raccoon objected and latched onto the member. That drove the workman, naturally, from his job and [illegible] traffic.

City police, the Navy shore patrol, the highway patrol and sheriff's department answered the emergency call of trouble at the Cow Bayou bridge. Patrol cars streamed out the highway and along with them trailed the customary siren chasing curious.

Navy Chief J. H. Hellebrand tried Navy tactics first. But, his distress was evident soon as he turned to what he described later as "Navy language which the coon didn't understand."

Gaff Didn't Work

Then Orange Police Identification Chief Johnny Higdon tried to snag the coon out with a fish gaff; he too failed. The other officers, Deputy Tom Eddleman, Highway Patrolman C. C. Bearden and Pound Officer J. W. Butler tried their various and sundry methods.

When all had exhausted every known means of bringing out mama coon Officer Higdon went back beneath the bridge with his six-shooter. That's how come mama coon is dead and the foundling home established.

Officer Higdon decided he'd make the new home for the raccoons and brought them back to town.

This afternoon the highway crew will continue its bridge maintenance work.

Note:

The Beaumont District has submitted requisition for a coon dog.

Better Control of RC-2 by Use of Curing Index

C. W. Chaffin, *Senior Chemical Engineer*
MATERIALS AND TESTS DIVISION

Have you, as engineer or maintenance man in the field, had one shipment of RC-2 give excellent results in making cold mix while the very next shipment set up in a day or two in the stockpile? Or, maybe on the other extreme, excess blading was required to drive off sufficient volatiles to prevent shoving. In the case of blade mix, did the blade man ever complain of an RC-2 becoming unworkable before he had sufficient time to do a satisfactory mixing job? Have you had an RC-2 to remain very tender for a week or more in a seal coat, surface course, or seal patches? Have you had one RC-2, when used for raised center striping, stay soft and be floated off by rain while another withstood the rain after being down only half as long?

More than likely you can answer yes to one or more of these questions. When such a condition occurred, did you ask, could there have been a difference in those RC-2's? Again, we believe the answer could be yes; in many instances there was a big difference. You will note that all of the above variations involve curing. Since all of the RC-2 was purchased and tested under the same specification, then just why is there such a difference? The curing index tells the story.

The curing rate of a cut-back is governed by the characteristics of the base asphalt and the amount and volatility of the solvent-thinner. Since the penetration of the residue is held within close limits and the amount of thinner is restricted for a given base asphalt by the viscosity range, it is the variation in the volatility of the thinner that accounts for these wide differences in curing. It is the purpose of the distillation requirement of the specification to control the volatility of this thinner, so let us take a look at the distillation results of three RC-2 samples which we have designated A, B, and C, in the accompanying table. The "per cent of total cut-back" column is shown as on our test reports; however, we have recalculated and shown these values as "per cent of total distillate" in order to more readily illustrate the large difference in volatility of the distillate.

By comparing the following distillations, it is obvious that there is a great deal of difference in the volatility or boiling range of the solvent used in each of these RC-2's, although all three are well within our specifications. For example, the initial boiling points (temperature to which RC-2 has to be heated in order to get off the first drop of distillate) are 270°F, 308°F, and 374°F, for A, B, and C, respectively. Likewise, the "per cent of total distillate" column reveals that for any temperature, the amount of distillate given off becomes progressively less in the order of A, B, and C. Looking at the 374°F point, we note

Distillation Results of RC-2

	A		B		C		T.H.D. Spec.
	% of Total Cut-back	% of Total Distillate	% of Total Cut-back	% of Total Distillate	% of Total Cut-back	% of Total Distillate	% of Total Cut-back
Distillation:							
Initial Boiling Point	270°F		308°F		374°F		
Off at 320°F	7.0	28.0	1.0	3.8	0	0	
" " 347°F	11.0	44.0	3.0	11.3	0	0	
" " 374°F	14.0	56.0	9.0	34.0	0	0	
" " 437°F	19.0	76.0	17.0	64.1	12.5	43.8	10 min.
" " 500°F	22.0	88.0	21.5	81.1	20.0	70.2	
" " 600°F	24.0	96.0	24.5	92.4	26.0	91.2	30 max.
" " 680°F	25.0	100.0	26.5	100.0	28.5	100.0	5 max. between 600-~~800~~ 680
Curing Index	14		33		95		

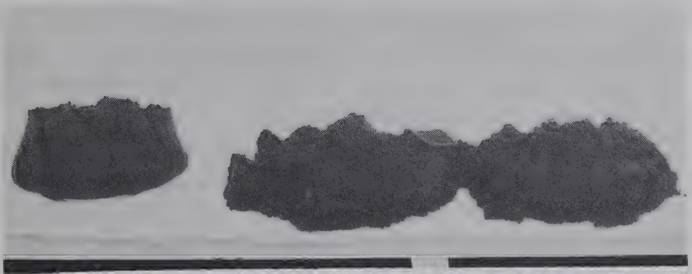
that A has already given off 56 per cent or over half of its distillate, while B shows only 34 per cent and C shows 0. These results indicate that the thinner used in an RC-2 may not necessarily be a gasoline type as in A, but may have considerable kerosene in it as in the case of C.

It therefore follows that the evaporation rate on the job of the solvent from these three RC-2's, when used under similar conditions, will be increasingly slower in the order A, B, and C. So to have a definite yardstick of comparison for this evaporation or curing rate, the laboratory worked out a method of calculating a numerical value which is called the curing index or CI. The CI is a number which is derived from the distillation values and takes into account the amount and volatility of the thinner. It is based on fundamental principles of evaporation and was correlated with actual evaporation tests made on RC-2. In the case of our samples A, B, and C, we have a CI of 14, 33, and 95. These CI values then tell us that, when used under similar job conditions, A with a CI of 14 could be depended upon to cure out about seven times as fast as C with a CI of 95.

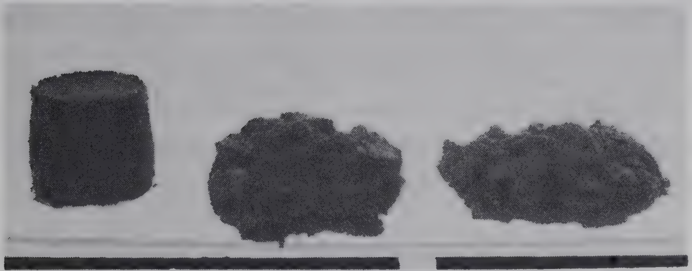
For visual demonstration an RC-2-sand mix was made up using each of the foregoing cut-backs A, B, and C. Samples were made and handled exactly alike, and at intervals, specimens were molded in order to show the point at which the consistency of the residual asphalt was sufficient to hold the sand grains together. The accompanying pictures readily show the variation in curing with CI. For instance, Figure 1 shows that sample A, with a CI of 14, had already reached a point near molding consistency in only two and one-half hours, while even after 24 hours sample C, with a CI of 95, still begins to fall apart immediately as shown in Figure IV.

Largely as a result of our curing index work, most of the asphalt producers have realized the value of improving their RC-2 material by supplying a more uniform product in this respect. However, since RC-2 has many different uses, it is evident that the best curing rate for one use may not be best for another. The first use of the CI was in the control of RC-2 being used in cut-back asphaltic concrete as produced by commercial plants. Through investigation of both satisfactory and unsatisfactory mixes,

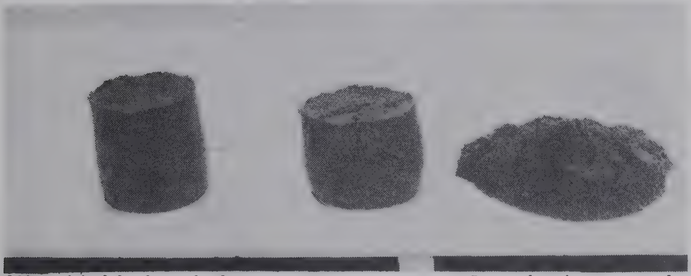
Left to right: Sample A, Cl 14; Sample B, Cl 38;
Sample C, Cl 95.



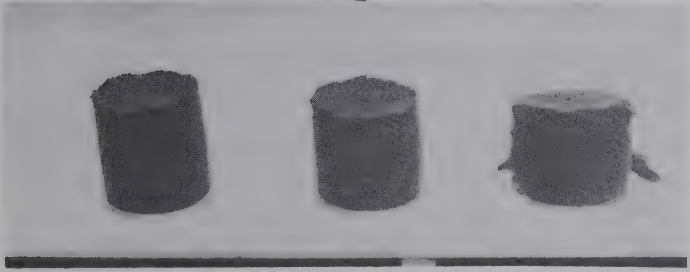
I. Molded two and one-half hours after mixing. Sample A is already nearing point of molding consistency.



II. Molded five hours after mixing. Sample A is standing while B and C have fallen apart.



III. Molded eight hours after mixing. Sample A is standing rigidly, B is standing but bulging slightly, while C has fallen completely apart.



IV. Molded 24 hours after mixing. Samples A and B are standing rigidly while C is still falling apart.

a CI range of 25 to 40 has been established as best suited for such work. This same range has also been found to give excellent results by some of the districts making their own cold mix and blade or road mix.

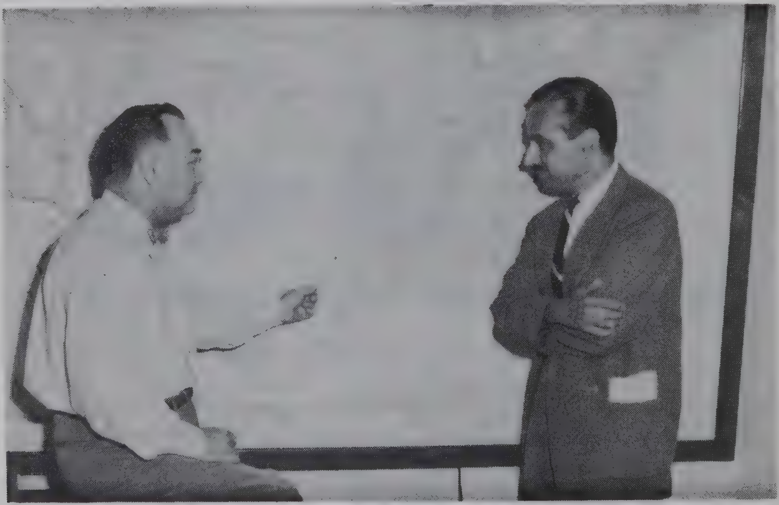
In the case of seal coats, seal patches, surface courses, and raised center striping, several districts report greatly improved results with RC-2 having a maximum CI of 20. In these cases extra fast curing is beneficial and from the producers' standpoint it is not practical to specify lower than a 20 maximum. It must be remembered that there are other important factors such as warm or cool weather, traffic, and condition of road, which also enter into the choice of an asphalt and the results obtained from seal coats, surfaces, and patches. It is not to be construed that RC-2 is unconditionally recommended for such work, but where it has been the practice to use RC-2 for these purposes, an RC-2 with a maximum CI of 20 should give more uniform and better results. Even the fastest curing RC-2 will probably remain tender a day or so in hot or warm weather because the high temperature softens the residue more than it speeds up the curing.

All that is necessary in ordering RC-2 with a CI requirement is to add to the usual specification statement "Curing Index to be 25 to 40," or "Curing Index to be 20 maximum," according to which one is desired.

Specifications should not be one bit more restrictive than necessary to assure adequate results on the job. However, you as the engineer and maintenance man have a right to reasonable assurance of obtaining a material that can be depended upon to give uniform results under similar job conditions. Closer control of the curing of RC-2 by means of the curing index will at least eliminate one of the many variables with which you are confronted.

* * *

BENNETT TALKS "TURKEY" WITH A TURK . . .



Fred Bennett, Engineer of Traffic Services, points out and explains the principles and procedures involved in numbering U.S. Routes to Y. Mimar Adli S. Yener of the Turkey Highway Department. Yener is in this country studying the highway system. He spent several weeks traveling over the state and learning the special traffic services offered Texas motorists.

Reflectorizing Vertical Surfaces by Machine Method

R. N. JENNINGS, MAINTENANCE ENGINEER
DISTRICT 7

District 7 has certain islands and curbs at intersections and bridges that need reflectorizing to be highly visible. Painting and beading with the materials used for our barrier stripes give the effect desired if the paint and beads are uniformly applied.

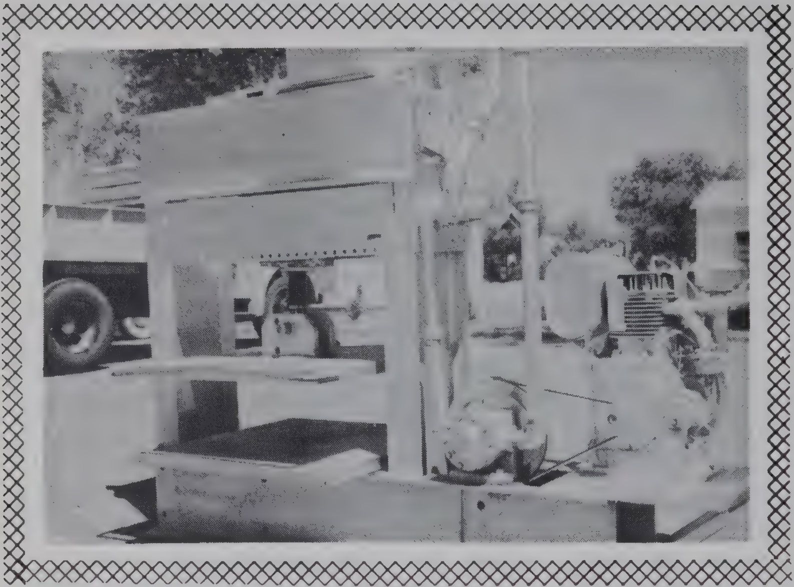
Painting with a brush and casting on the beads by hand was a slow and expensive operation and the results gave a spotty and blotched appearance.

A method using a paint gun for applying the paint and a sandblaster for placing the beads was suggested by Herman Gotcher, Shop Foreman at San Angelo, and developed by Scottie Houston, Maintenance Foreman at Ozona. Houston found that a rectangular opening at the blasting nozzle rather than a circular opening gave more uniform distribution of the beads. He also found that the air pressure had to be kept low to prevent the beads from embedding themselves too deeply in the paint. Bead application had to follow painting operations closely to prevent drying of the paint before beads were embedded.

Paint gun and sandblaster work off one compressor.

Bead application follows painting closely.

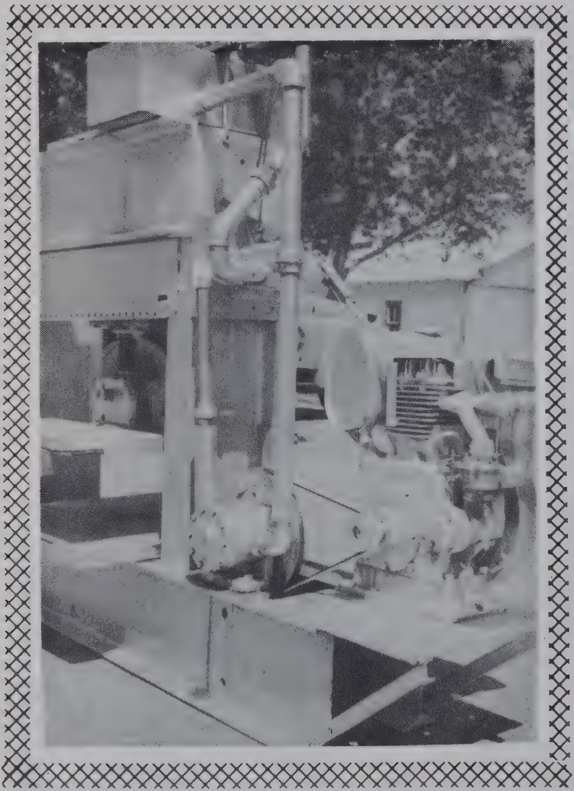
Application of beads with rectangular opening on blasting nozzle.



Sign

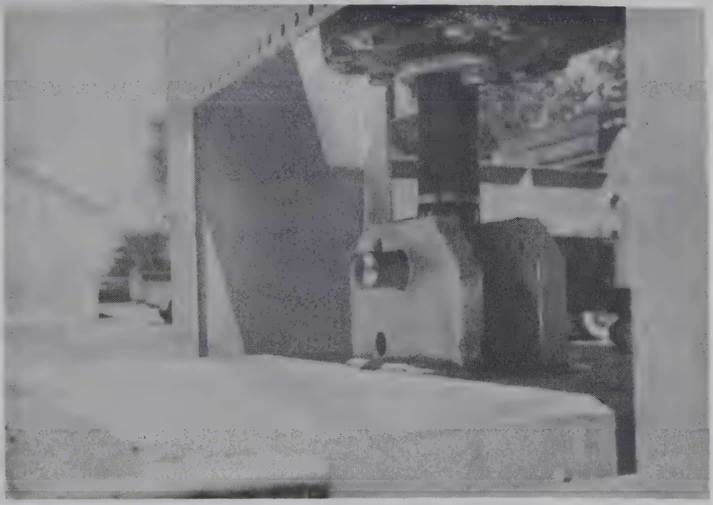
ROY GREER,

DISTRICT



Pictured here are three views of a sign press constructed by District 24 under the direction of Ed Preusser, District Shop Foreman, at an approximate labor cost of $277. The press works very satisfactorily on signs up to 30 inches square, pressing out bullet holes and sharp dents or bends. It does not take out entirely all the warp, but this is easily taken out with a hammer.

As seen in the picture, the construction is fairly simple and largely utilizes salvaged material. The two steel plates are 1 1/2" x 32" square. The hydraulic cylinder and ram was taken from a TD-18 dozer when it was



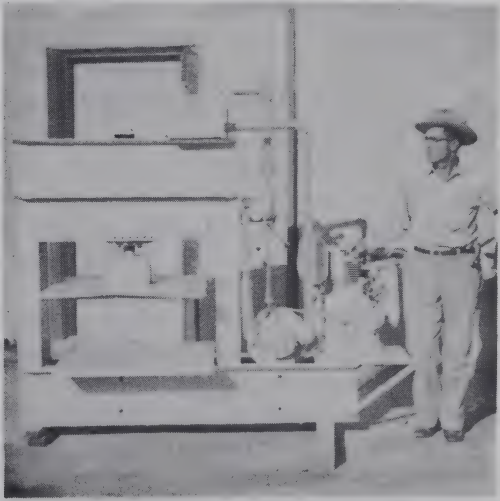
Press

Equipment Supervisor

24

changed over to cable operation. The oil pump came from an ID-9 front end loader. The Wisconsin motor has a three and five-eighths inch bore by four inch stroke and was taken from an old roller. The two uprights of the frame are single twelve-inch I-beams. The upper and lower cross members are each of two twelve-inch I-beams. The hydraulic cylinder is held to the upper cross members by two 1" x 6" straps welded to the I-beams.

This press straightens out the sign plates quickly and cheaply. It works very well for removing bushings from track links and undoubtedly will be found useful in other ways around the shop.



About Our Tourists...

Last year the Texas Highway Department public information services assisted over one-half million people with their travels. Some 447,000 of these visited the Highway Travel Information Bureaus where they received a great big Texas welcome along with information, maps, and other material. The Austin Office Information Section answered and filled some 183,900 individual requests received through the mail.

In 1951 our highways were used by 9,156,000 out-of-state tourists who traveled in some 3,391,000 automobiles and spent a total of $375,200,000 in our state.

The Highway Travel Information Bureaus were able to increase the length of the visits by 8 per cent of the average out-of-state tourists stopping for services. This increase in travel amounted to something like 6,108 extra "tourist days" which increased our tourist industry by $119,000. In addition to these monetary benefits, the Texas Highway Department, through rendering this information and service to the general public, promoted good will and strengthened our travel relations.

It is estimated that 96.3 per cent of the tourists in the United States travel by private automobile, and ride 2.7 people per car. The survey of our 1951 tourists revealed that the size of the tourist party is larger during the summer months of June, July, and August. However, during this season the individual tourist spends less money per person per day. More tourists visit Texas for vacation purposes during the months of January, February, and March, and also during this time the greatest number of tourists are visiting Texas for the first time.

The survey further showed that our roadside parks are used consistently throughout the year. The peak of their popularity is during the summer months with an average of 64 per cent of our tourists using one or more of the parks during their travels within the state. During the month of January, some 45 per cent of our tourists stated that they used one or more of our parks.

STATISTICAL BREAKDOWN OF OUT-OF-STATE TOURISTS VISITING TEXAS

State	Total Number of Cars Stopping at Bureaus	Total Number of Cars Entering Texas (approximate)	Total Number of People Visiting Texas (approximate)
Alabama	1,719	68,800	185,800
Arizona	1,719	68,800	185,800
Arkansas	2,426	97,000	261,900
California	13,329	533,000	1,439,100
Colorado	1,081	43,000	116,100
Connecticut	475	19,000	51,300
Delaware	76	3,000	8,100
Florida	2,534	101,000	272,700
Georgia	1,340	53,600	144,700
Idaho	242	9,700	26,200
Illinois	6,086	242,500	654,800
Indiana	2,749	110,000	297,000
Iowa	2,402	96,000	259,200
Kansas	1,981	79,000	213,300
Kentucky	659	26,000	70,200
Louisiana	6,843	273,700	739,000
Maine	160	6,400	17,300
Maryland	331	13,000	35,100
Massachusetts	736	29,400	79,400
Michigan	3,587	143,500	387,500
Minnesota	2,051	82,000	221,400
Mississippi	1,522	61,000	164,700
Missouri	3,555	142,000	383,400
Montana	246	10,000	27,000
Nebraska	848	34,000	91,800
Nevada	224	9,000	24,300
New Hampshire	114	4,600	12,400
New Jersey	1,073	43,000	116,100
New Mexico	1,636	65,400	176,600
New York	3,030	121,000	326,700
North Carolina	896	35,800	96,700
North Dakota	294	11,800	31,900
Ohio	3,824	153,000	413,100
Oklahoma	4,562	182,500	492,800
Oregon	911	36,400	98,300
Pennsylvania	1,860	74,400	200,900
Rhode Island	140	5,600	15,100
South Carolina	506	20,000	54,000
South Dakota	227	9,000	24,300
Tennessee	1,845	73,800	199,300
Utah	290	11,600	31,300
Vermont	72	3,000	8,100
Virginia	876	35,000	94,500
Washington	995	39,800	107,500
West Virginia	296	11,800	31,900
Wisconsin	1,509	60,000	162,000
Wyoming	211	8,400	22,700
TOTALS	84,088	3,360,300	9,073,300

ABOUT THE DISTRICTS

SECTION WAREHOUSE, DISTRICT 8

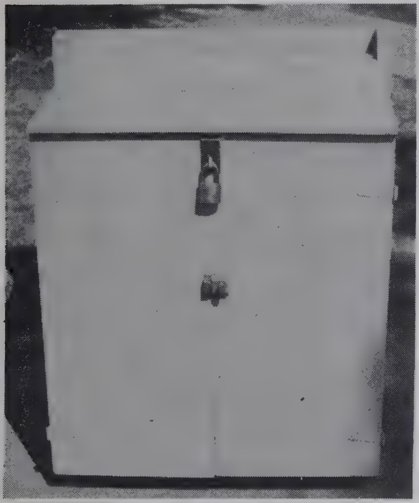
Interior Views - Note neat arrangement of tools, and unique sign rack. N. P. Windham, Maintenance Foreman in Mitchell County, is pictured.

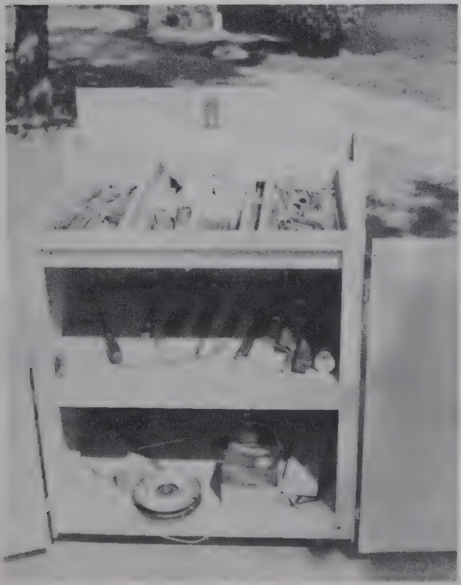
DISTRICT 3 PORTABLE TOOL BOX

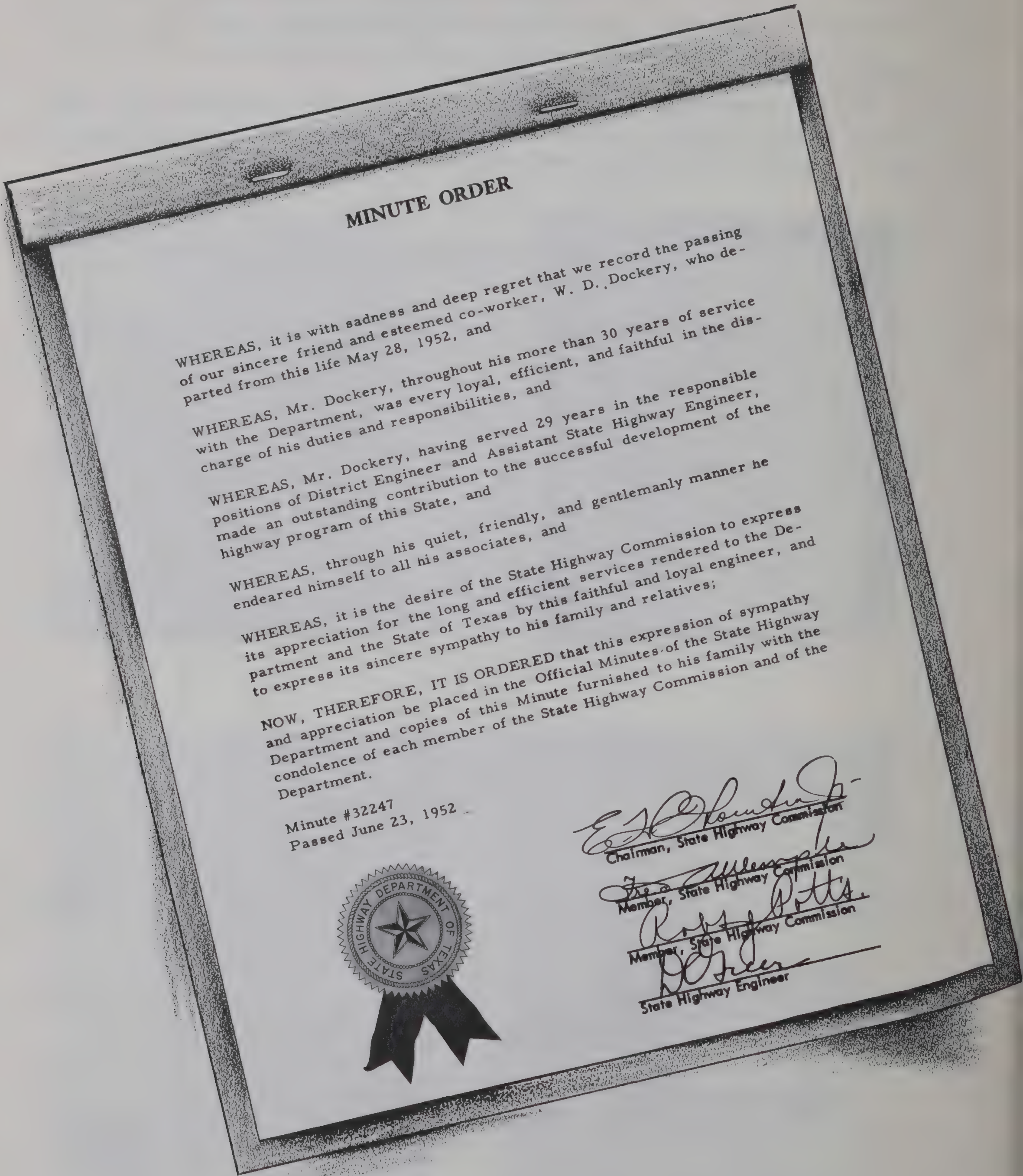
This novel tool box, in use in District 3, permits the mechanic to keep his tools and accessories in easy reach. Tools can be stored by folding the doors and lid and locking.

The box, for use in district shops or outside, was designed and built by Tom E. Williams, Shop Foreman, pictured at the box.

There are three boxes made in District 3, and others of similar design are possibly in use in other districts. Construction is simple. The one-inch plywood is painted gray. The lid raises and lowers into a slot in back.







MINUTE ORDER

WHEREAS, it is with sadness and deep regret that we record the passing of our sincere friend and esteemed co-worker, W. D. Dockery, who departed from this life May 28, 1952, and

WHEREAS, Mr. Dockery, throughout his more than 30 years of service with the Department, was every loyal, efficient, and faithful in the discharge of his duties and responsibilities, and

WHEREAS, Mr. Dockery, having served 29 years in the responsible positions of District Engineer and Assistant State Highway Engineer, made an outstanding contribution to the successful development of the highway program of this State, and

WHEREAS, through his quiet, friendly, and gentlemanly manner he endeared himself to all his associates, and

WHEREAS, it is the desire of the State Highway Commission to express its appreciation for the long and efficient services rendered to the Department and the State of Texas by this faithful and loyal engineer, and to express its sincere sympathy to his family and relatives;

NOW, THEREFORE, IT IS ORDERED that this expression of sympathy and appreciation be placed in the Official Minutes of the State Highway Department and copies of this Minute furnished to his family with the condolence of each member of the State Highway Commission and of the Department.

Minute #32247
Passed June 23, 1952

E H Thornton Jr.
Chairman, State Highway Commission

Member, State Highway Commission

Robt J Potts.
Member, State Highway Commission

D C Greer
State Highway Engineer

"Comments From the Traveling Public"
OVER THE HIGHWAYS

. . . Hats off -- to Texas. Best roads of any state traveled . . .

Chas. F. Walshon
Chicago, Illinois

. . . State road markers should show direction being traveled. One can go 50 or more miles in wrong direction with no one to ask regarding his whereabouts . . .

R. E. Warner
New Haven, Connecticut

. . . We didn't like the black stripe in center of highways. White is preferred, or placing gravel on center black stripe. A truck threw gravel and broke our windshield . . .

Fred W. Doring
Whippany, New Jersey

. . . It seems that every state talks about tourist attractions but Texas does something. I believe those Highway Department Bureau attendants are the most courteous and helpful persons I have encountered . . .

J. A. Richards
Murray, Utah

. . . We found highway travel hazardous on account of heavy truck travel. This, however, is not as you know, found only in Texas . . .

Mr. & Mrs. Edward W. Harty
Highland Park, Illinois

. . . Route markings are far too small in quantity. Texas should be first in this matter. On the long lonely stretches, telephones should be available for calling Highway Patrol etc. for help . . .

Union, Missouri

About two weeks ago the writer had what we consider a "lucky" smash-up (if there is such a thing) at the 5-mile-south-of ----- hill. where many other accidents have happened. Just "over the hill" from the ----- side a highway truck was unloading gravel, or some road substance, and we were following some five or six cars - had been for many miles - but when the line came upon the highway truck, it was partly on the concrete, they all hastily piled up there and we brought up the rear; when we applied our brakes, the mud that had gathered during the showers (and it was raining slowly at the time) made the road so slippery we could not bring our car to a stop; we had to take to the middle of the road, only to meet an oncoming car, and we side-swiped one another; we went into the ditch. Fortunately at that point the ditch was shallow, and we brought our car to a stop without anyone getting hurt. We carried adequate insurance and both cars were taken care of.

But the complaint is against the nature of the road in that particular territory. Even though I have been driving since 1919 and have had no wrecks, the situation there is hazardous even for an experienced "road-man." In the first place, we think danger flags should be put up on the side of the road where trucks are working, and especially when they are liable to cause the piling up of cars on the main highway. In the second place, the shoulders are very narrow at this particular point and the roadbed is narrow.

We simply wanted to contribute a protest about the hazardous road all along through the hills south of -----.

We hope consideration is being given to the improvement of the most dangerous parts at least; it would be better, still, if a way could be seen to widen the entire stretch mentioned.

Very truly yours,

(Signed)

● ● ●

I don't believe I can get all my comments on the card, so I will just add a note.

My only dislike about Texas was the way the main highways were routed through the middle of towns and cities. I had a definite goal to reach in Texas and I definitely didn't like to go through the business district of every city, town, and hamlet.

The likes were numerous. The first is the wonderful highways. I have never seen such wide, smooth, and straight highways. Whether it is the terrain or your department, you are to be congratulated.

Another like was your information stations. I was particularly impressed by the one at Denison. The officer there at the time was most courteous and most helpful.

Your department was responsible for a great deal of my pleasure while in Texas.

Thanks,

Robert D. Shaw
Willow Springs, Missouri

● ● ●

COMMENTS FROM OUT-OF-STATE TOURISTS ON WHAT THEY DISLIKED ABOUT TEXAS

Taken from Traffic Services Survey Cards issued to
motorists stopping at Travel Information Bureaus.

- Lack of pretty girls . . .
- Mosquitos . . .
- Dead skunks . . .
- Cowboy hats inside restaurants . . .
- Boasters . . .
- Not enough wide open spaces . . . .
- Rattlesnakes, scorpions, centipedes, and Democrats . . .
- No grits for breakfast . . .
- No escalators in department stores . . .
- Dry state . . .
- Ungentlemanly drunks in cafe . . .
- Johnson grass and Russian thistles . . .
- Texas is not Bad -- it's just BIG . . .
- That I was not born and raised in Texas and lived there all my life . . .
- Hillbilly music . . .
- No Yankee doughnuts . . .
- Poor scrawny sheep . . .
- The Texas mile. They are twice as long as anywhere else . . .
- Southern coffee . . .

A New Hazard Uncovered

The Columbus and Southern Ohio Electric Company has done some research regarding the hazard created by blasting caps and radio transmitters.

It has been found that the use of radio during blasting makes it entirely possible to set off caps without any physical contact whatsoever. It takes a very small amount of R. F. to ignite either AC or DC current. The lower the frequency, the greater the danger.

There is danger from electronic-diathermy-high frequency furnaces-welders high frequency power-in fact most any electrical equipment that produces R. F. voltage.

In view of the danger involved, the following instructions have been issued.

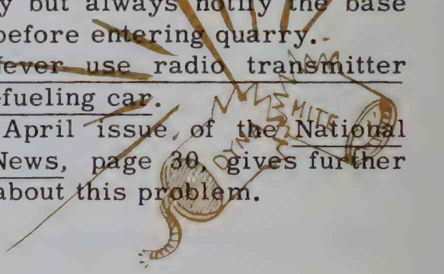
KEEP RADIO AWAY FROM BLASTING CAPS

If you do blasting, or are in the vicinity of blasting, -- KEEP RADIO AWAY FROM BLASTING CAPS OR CONNECTED CONTROL WIRES. Radio frequency energy from such sources as radio broadcasting stations, two-way radios, television transmitters, FM stations, radar, shoran microwave relays and high powered amateur transmitters, can set off blasting caps without having any physical connection with the blasting circuit.

The following rules shall be adhered to at all times by employees driving company equipment with two-way radios:

1. If electric caps are within 300 feet of any two-way radio transmitter, keep them in a tightly closed all-metal can. Never open can when transmitter is in use.
2. Never carry caps in a pickup or car equipped with two-way radio, unless they are in an all-metal can. This can should consist of a 24-gauge iron box lined with wood.
3. Do not use a radio transmitter within 300 feet of any electric blasting or connected control wires.
4. Never use a radio transmitter when driving a company car down into a quarry but always notify the base station before entering quarry.
5. Never use radio transmitter while refueling car.

The April issue, of the National Safety News, page 30, gives further details about this problem.



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IN MEMORIAM

On July 2, 1952, Ed Lee was run over and killed while flagging traffic for a maintenance crew approximately three miles north of Pleasanton on U. S. 281. The car that hit Mr. Lee approached at a high rate of speed, and disregarding warning signs and barricades, did not attempt to reduce speed until it was too late to avoid an accident.